MECHELECIV

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THE GEORGE WASHINGTON UNIVERSITY

SCHOOL OF ENGINEERING AND APPLIED SCIENCE

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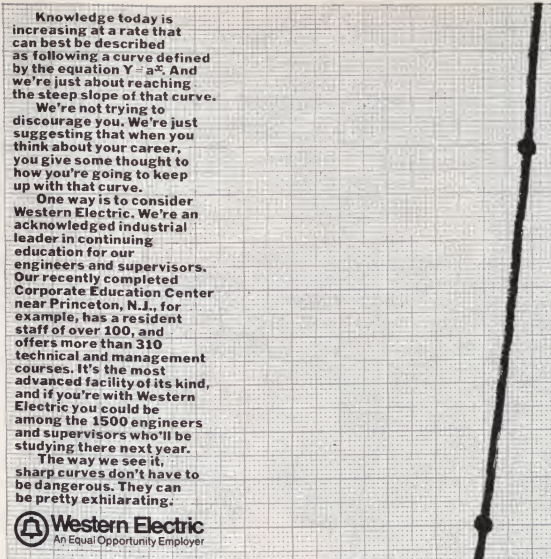

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"Point of Order"
Engineers' Council '69-'70

Guest Editorial

A new Engineer's Council is taking office, and as my year as President of the Council draws to an end, I would like to express some of my thoughts about the S.E.A.S.

I was elected President of the Council in March 1969. Having been a student here for nearly three years, I felt that I had an understanding of the student's major problems in our school. The most serious of these problems, were the lack of communication between the students and the faculty and administration, a disregard for the student government, and an overwhelming apathetic attitude among the students.

These problems still exist. I have come to realize, however, that these problems do not belong to the students alone, but rather, they belong to the school as a whole and for that matter to the University. Perhaps I am idealistic, but I believe that we can bring an end to these and other problems at the S.E.A.S. The solution, however, can not emerge from any one group of the school; i.e. students, faculty, or administration. Nor will the solution come about due to the efforts of a half-dozen people from each of these groups acting independently. We must develop a coherence among students, faculty, and administration that will generate the greater spirit of an academic community.

For a long time, the student body has been little more than a passive element. It is high time that the students had a meaningful voice in the affairs of the school. There is also a greater need for more faculty participation in the student organizations. The students are intelligent, creative, productive, and sincere. However, they do not have the wisdom or the experience of the faculty that could provide the stability and the continuity so lacking in the student groups. I am not suggesting that the students and the faculty become so engulfed in the academic community that they lose their identity, but the present situation of virtually nothing in common except the classroom is at the other extreme.

So long as any one group of the school considers itself to be independent of the others, the S.E.A.S. will swim in mediocrity. For once, let this school demonstrate its desire for progress and set an example that others might follow.

Robert S. Grant

LETTER TO THE EDITOR

CONCERNING LABS

Dear Sir:

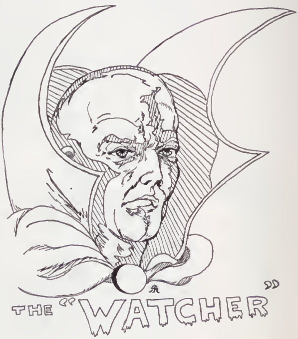
It's a strange feeling when you're a Junior EE and walk into your first lab in the *sixth* semester and find out that you don't know how to work a voltmeter. But then you feel re-assured after the initial shock of realizing your ignorance in such practical matters, since there is a full professor and a lab assistant on hand whom you somehow believe will instruct you in the uses of such a trivial electronic device as a voltmeter. After your first lab you find out that you are no longer worried about the precious little voltmeter since you have just been confronted with and totally crushed by the monstrous assortment of equipment on the lab bench. It seems that the lab assistant has somehow forgotten to explain the operation of these devices which you have to use to complete your first experiment, in fact, he hasn't even told you what the hell they are.

If you are an overly concerned student, you rationalize at this point; "if the lab assistant won't tell me or doesn't know himself so he can tell me, I'll ask the professor." Well, this approach may seem quite logical to any admirer of Mr. Spock, but there is an obstacle, or should I say absence of an obstacle, in this path to enlightment: the professor very rarely shows up in the lab. But of course you can see him in his office during his assigned hours if you feel up to hiking to the luxurious hide-away of many of our distinguished faculty, found on the main highway towards Georgetown.

After a few more labs, even the totally unconcerned students start to ask themselves and others, WHY? Why don't I know about such things as voltmeters, power supplies, wave generators, oscilloscopes and other bewildering devices before my sixth semester as an EE at G.W.? Then he looks into his Engineering Catolog to see if he's forgotten to take some courses somewhere in his last five semesters in S.E.A.S. He finds out that he has taken everything required including his 18 hours of humanities to make him human. Now, he says to his classmates, maybe it's just the morning lab that's so disorganized. Upon switching lab sections to the night class, he finds an instructor who actually teaches him how to work the damn voltmeter and other assorted black boxes. But why should a full time undergraduate be forced out of necessity into a night class? And, again, why should he be learning such trivial operations on basic lab equipment this late in electrical engineering? It wasn't taught in the physics labs during the freshman and sophmore years. Then this poor, nearly insane junior EE looks at his catolog (the new one, that is) and sees a course called ApS 1 & 2. Maybe the new freshmen are learning about the operation and uses of basic measurement devices in this new course? Not this year, friend! And now this poor, nearly insane, junior EE turns to the Faculty and Administration of S.E.A.S. and asks: WHY? ? ? ? ?

Signed,

THE WATCHER



LETTER TO THE EDITOR POLICY. The opinions set forth in the "Letter to the Editor" page of this magazine are not necessarily the opinions of the staff of *Mecheleciv* magazine. This page is set aside each issue for use by students, alumni, faculty, and staff of the School of Engineering and Applied Science. The staff will also accept letters from other sources if the letters concern the magazine or would be of interest to the students, alumni, faculty, and staff of the S.E.A.S. *Mecheleciv* reserves the right to edit any letter if lack of space deems it necessary. If, in the opinion of the Editorial Staff of *Mechcleciv*, a letter appears to be unprintable, the staff reserves the right to return the letter to the sender stating the staffs' reasons for withholding it from publication. All letters must be signed; however, pen names may be substituted if requested.

Campus News

GWU-NASA RESEARCH GROUP TO DEAL WITH PROBLEMS OF NOISE

The George Washington University and the National Aeronautics and Space Administration are forming a blue-ribbon group of researchers and deal with problems of alleviating noise.

Dr. Harold Liebowitz, Dean of the School of Engineering and Applied Science, will be the principal Investigator in the acoustics research program, funded by an $87,148 grant from NASA.

The program, which will be based at NASA's Langley Research Center, is expected to provide a technical base for acceptable acoustical design of ground transportation systems, noise-resistant structures, aircraft, and space vehicles.

The activities of the group, according to Dean Liebowitz, will include analytical and experimental research in the areas of noise sources, noise propagation, and the responses of people to noise and sonic boom phenomena.

Other members of faculty of the GWU School of Engineering and Applied Science who will participate in the program include Dr. S. W. Yuan, Dr. Warren Mason and Dr. Selwyn E. Wright. Dr. Wright, assistant research professor of engineering, recently joined the GWU staff after having served with the Institute of Sound and Vibration Research at the University of Southampton, England.

NOTED ENGINEER-EDUCATOR APPOINTED TO SEAS TEACHING POST

Dr. Joseph V. Foa, distinguished researcher-educator, has been appointed professor of aeronautical engineering in the George Washington University School of Engineering and Applied Science.

Dr. Foa comes to his new teaching post from Rensselaer Polytechnic Institute in Troy, New York, where he also was professor of aeronautical engineering since 1952.

In announcing the appointment, Dean Harold Liebowitz cited Dr. Foa as one of the foremost leaders in transportation and propulsion.

"He has contributed significantly to novel concepts of high-speed transportation and has been awarded patents on transportation means, energy exchangers, generators of rotating flow, and energy separators.

"He brings a wealth of experience and achievement to the School, including background in private industry, the academic community, and government consultation."

Born and reared in Italy, Professor Foa holds advanced degrees from the Politecnico di Torino and the University of Rome.

His professional experience began in 1933 as a research and project engineer with Italy's Piaggio Aircraft Corporation. Three years later he moved to the Caproni Aircraft Corporation as chief engineer. In 1937, he returned to Piaggio as project engineer and consultant.

He came to the United States in 1939 as project engineer for the Bellanca Aircraft Corporation in New Castle, Delaware. He also has held top-level posts with the University of Minnesota, Curtiss-Wright Corporation, and the Cornell Aeronautical Laboratory. Dr. Foa became a U.S. citizen in 1944.

A member of several professional and scientific societies, he has written more than 50 publications, including his

most recent paper, "A Pressure Exchanger for Marine Propulsion," which was presented at the Automotive Engineering Congress in Detroit in mid-January 1970.

Professor Foa and his family reside in Chevy Chase, Maryland.

FACULTY NEWS

Dean Harold Liebowitz was recently elected as Director of the Society of Engineering Science, Inc. Dean Liebowitz now has the distinction of holding two offices in the Society: Vice President and Director.

The Society of Engineering Science, Inc., is a nonprofit membership corporation organized to promote the interchange of ideas and information among the various fields of engineering science and between engineering science and the fields of theoretical and applied physics, chemistry, and mathematics. It is dedicated to the advancement of interdisciplinary research and to the establishment of a bridge between science and engineering.

Dr. Alfred M. Freudenthal, Acting Chairman of the Department of Engineering Mechanics and Technical Director of the Institute for the Study of Fatigue and Structural Reliability, addressed the Maryland Institute of Metals in Baltimore, early in March. The talk was sponsored by the Engineering Materials Group of the University of Maryland.

Dr. Freudenthal's talk, "Fatigue Mechanisms and Fatigue Performance," stressed the interdisciplinary approach to the study of fatigue problems.

The Maryland Institute of Metals is a forum for those interested in metallurgy and related sciences, whose purpose is to keep its membership abreast of significant, current developments, discoveries and techniques in the field of physical metallurgy; and to provide a meeting ground affording intellectual stimulation to professionals, students, and teachers of metallurgy.

Professors Nicholas Kyriakopoulos and Vallobh Vimolvanich, both of the Department of Electrical Engineering, are coauthors of a paper, "Determination of Network Functions Using Nonlinear Differential Correction." The paper will be presented by the authors at the Southeastern Symposium on System Theory, to be held at Gainesville, Florida, March 16.

Drs. John Eftis, G.M. Arkilic, and D. E. MacDonald will present a paper, "On Strain Energy and Constitutive Relations for Alkali Metals," at the Fifth Southeastern Conference on Theoretical and Applied Mechanics, April 16-17, 1970.

The Conference is sponsored by the Schools of Engineering of North Carolina State University, Raleigh, North Carolina, and Duke University, Durham, North Carolina, and will be held on both campuses.

The purpose of the Conference is to stimulate interest in Mechanics by providing an outlet for technical papers on the results of scientific and engineering research of both applied and theoretical nature, and by encouraging informal exchange of ideas in the field of mechanics.

26 STUDENTS MAKE SEAS HONORS LIST FOR FALL SEMESTER 1970

Dean Harold Liebowitz has announced that twenty six students achieved the Honor List in the School of Engineering and Applied Science. The names of the students are given below.

In honoring these students at a small reception, Dean Liebowitz awarded each student with a certificate denoting their achievement. Before the certificates were presented by Assistant Dean, Dr. Archilic, President Lloyde H. Elliott and Dean Liebowitz gave short speeches congradulating these honor students. Also attending the reception were Dr. Harold F. Brigth, Vice President for Academic Affairs and Dr. Carl H. Walther, Assistant Vice President for Academic Affairs.

Faiz A. Al-Khayyal
David R. Armstrong
Ibrahim A. Ashie
Jacob M. Azrael
James B. Bladen
James Boland
Jerrold L. Bonn
Kenneth D. Dampier
Alfred S. DeLuca
Dennis G. Gallino
Edward I. Godin
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Paul M. Haldeman, Jr.
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Carroll A. Potter
Jack A. Schaeffer
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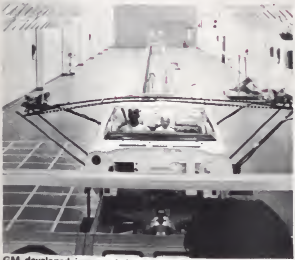
David R. Sobel
John A. Sporidis
Stephen M. Tenney

Tech News

Edited by Gregory D. Smith, E.E., '72



GM developed impact sled to simulate crashes up to 70 miles per hour.

GM SAFETY RESEARCH: NEW TOOLS, NEW KNOWLEDGE, NEW ACHIEVEMENTS

Safety has pervaded the work of the proving grounds since their inception more than 40 years ago, for safety has always been a basic goal of automotive engineering. Safety, previously implicit but unspecified in proving ground operations, became a separate function with a staff and a definitive assignment.

Continuing intensification of GM's safety improvement programs led to the construction at Milford of a Safety Research and Development Laboratory which serves as the evaluation center for all of GM's safety work. The largest installation of its kind in the world, it houses a staff of 110 persons and the most comprehensive array of automotive safety test equipment ever assembled.

One of GM's developments, the impact sled, serves as a means of non-destructively simulating crash tests with a high degree of repeatability. Powered by air pressure, the safety laboratory's two sleds can handle complete cars – or parts of cars – in simulated crashes at speeds up to 70 milles per hour. On a so-called "mini-sled," or on a number of other impact simulators developed by proving ground personnel, GM can measure the collision force of a driver with a steering column, the striking of a passenger's head or knee on an instrument panel.

However, the ultimate test of an automobile's safety integrity is a full-scale collision. Thus the proving grounds crash test 300 to 400 new cars and trucks a year. Each vehicle carries electronic strain gauges, accelerometers or other sophisticated measuring instruments. Many of the vehicles are fitted with experimental safety devices and have the most advanced crash test dummies as passengers. Then, as a battery of electronic sensors reports the results of the test the vehicle is crashed into a 92-ton concrete barrier, another vehicle or some other obstacle.

GM's crash-testing of complete vehicles goes back more than 30 years. The early tests were relatively simple in keeping with the state of automotive development. Test drivers would aim a car at a barrier or at another car, get it up to speed and then leap to safety seconds before the collision. To simulate a roll-over the vehicle would be overturned at the top of a hill and allowed to roll to the bottom. A post-mortem of the wrecked machines would follow.

However, as motor vehicles were improved to meet the public's demand for better transportation, the quality of full-scale crash testing – upon which much of the success of design and engineering changes was so dependent – improved, too. Measuring and recording devices of greater

Full-scale crash testing destroys 300-400 new cars and trucks a year.

sensitivity, versatility and fidelity were developed; high speed motion picture cameras were introduced to photograph the tests; the accuracy and speed with which test data were interpreted were markedly advanced. The introduction of electronics and high speed data processing systems elevated full-scale crash testing to a high level of technical competence.

Constant upgrading of the ability of crash test dummies to simulate the reactions of human beings to collision forces also helped achieve the main objective of the test program – better protection for the occupants of GM vehicles. With greater knowledge of the way humans would probably react in an accident, passenger compartment designers were able to incorporate additional protection.

A new level of human simulation was reached with "Sophisticated Sam," the forerunner of the latest series of increasingly realistic dummies. "Sam" is the descendant of the early-day, semi-articulated parachute dummies first used in automobile crash testing. Their main shortcoming – like that of subsequent dummies, was that they did not reproduce the motions of the human body with sufficient accuracy. To get a more useful instrument, GM commissioned a California dummy manufacturer to help create a more lifelike, more fully articulated simulator.

The new figure was dubbed "Sophisticated Sam." It is so advanced, so lifelike – to the point that its bones fracture under the same pressure that breaks human bones – that the entire dummy can serve as a test instrument.

GM's full-scale crash testing is done at Milford where an enclosed barrier permits all-weather operation. One of the most advanced facilities of its type, the barrier is equipped to permit the test to be recorded on tape, film and other devices. Then the results are minutely studied. Motion pictures of the crash, for example, are examined frame by frame so that the movements of the dummy passengers can be plotted in thousandths of seconds or inches. Using information of this type, engineers are able to judge the effectiveness of a new energy-absorbing dashboard, pinpoint the best shoulder belt anchor location, evaluate an experimental child safety seat.

From such comprehensive facilities as the barrier, from such sophisticated devices as electronic accelerometers, from such expert technicians as the film analyzers come GM's advances in automotive safety.

NEW SOLAR OBSERVING TELESCOPE USES 64-INCH CORNING MIRROR BLANK

A powerful new solar observing telescope – housed in a pillar-like concrete structure towering 136 feet high and extending more than 200 feet below ground level – went into operation this fall at Sacramento Peak Observatory, Sunspot, N.M.

A key component in the unique \$3.3 million instrument is a 64-inch diameter fused silica mirror located in a 10-foot diameter tube near the bottom of the telescope shaft. The tiltable mirror reflects sunlight entering the top of the tower and focuses it back up into a variety of ground-level instruments.

The mirror blank was manufactured by Corning Glass Works and ground and polished by Davidson Optronics, Inc., West Covina, Calif.

Fused silica – one of the purest of man-made materials – was selected for the mirror because of its low-expansion properties, Corning said. It is also transparent and can be easily inspected, and can be ground and polished to exact dimensions.

Dr. Richard B. Dunn, Sacramento Peak astronomer and designer of the new telescope, said the studies may lead to a method for predicting when solar flares will occur.

Such information would be valuable in predicting periods of radio interference or in establishing a system for warning future astronauts working in space of potential radiation danger.

The solar energy bursts also can severely degrade the performance of Air Force communications, surveillance and navigation systems, and their high-energy protons can damage electronic equipment on satellites. The protons also cause large fluctuations in upper atmospheric density, an effect that produces a variable atmospheric drag on satellites and thus influences the precision of earth satellite

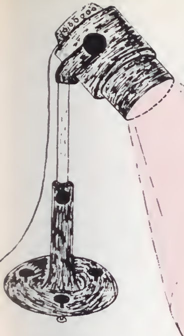
The Sacramento Peak Observatory solar observing telescope is a pillar-like concrete structure built on a 9,200-foot ridge in the Sacramento Mountains near Sunspot, N.M. Scientists of the Air Force Cambridge Research Laboratories will use the new instrument in studies aimed at finding ways to predict when and why solar flares and sunspots occur.

orbital prediction.

The project is the world's largest vacuum telescope. The entire optical system is contained in a chamber evacuated to 250 torr, a pressure which corresponds to an altitude of 180,000 feet. This is expected to eliminate the optical effect of air turbulence.

The instrument also is said to be more versatile than most because it is suspended from an eight-ton mercury bearing and rotates around a vertical axis. It can be moved quickly to direct the light beam to different instruments, allowing study of a solar event by several methods without taking time for positioning of instruments.

Sunseekers on the tower's turrent allow the telescope to pick up the sun in any part of the sky, and a surveillance TV camera with a 180° lens permits an observer to watch sky conditions.



FACULTY SPOTLIGHT

DR. A. ABD-ALLA

By Greg Eichert

Dr. Abd-alla has just joined the faculty of S.E.A.S. this past Fall as a full-time professor in the computer science option of the Electrical Engineering Department.

The courses he is teaching this year are primarily computer hardware courses, (EE 152, 153, 154, 251, & 352), and the senior electrical engineering labs.

Dr. Abd-alla received his BSEE at Ainshams University, in Cairo, Egypt, U.A.R. and his MSEE at the Alexandria University, Alexandria, U.A.R. After two years of post graduate studies at the University of California, Berkeley campus, Dr. Abd-alla completed his doctorate at the University of Maryland last summer.

Before coming to G.W.U., Dr. Abd-alla worked at the National Research Center in Cairo, U.A.R. as a research engineer between 1960 and 1964. During this time, he was also an instructor in mathematics at the University of Cairo and an instructor in electrical engineering at Ain-Shams University. While completing his doctorate at the University of Maryland, Dr. Abd-alla was a G.T.A.

His present research is centered on memory systems organization. Also, Dr. Abd-alla is a consultant for NASA at Langley, where he is teaching a course once a week.

He has authored a paper in switching theory of digital computers which was published in the Engineering Magazine of Cairo University. His doctoral dissertation was titled "Analysis of Source Organization for Multi-Program Computers" which was published in the University of Maryland's *Technical Research Report* and is also a NASA contract.

Dr. Abd-alla feels that the Computer Science Engineering curriculum is one of the better curriculums in computer science he has encountered in that the course sequence and content leads to an excellent blend of the software, hardware, and applications divisions of computer science. With the growing enrollment of EE majors in the computer science option, Dr. Abd-alla states that there is a critical need for more full-time faculty in computer science. (At present, there are sixteen courses offered in the computer science option with only one full-time faculty member.)*

Dr. Abd-alla is glad to see the increase in public relations work by the Admissions office in the area of undergraduate recruitment, but would like to see more scholarships awarded to undergraduates in the future.

Under the topic of ideas for the improvement of S.E.A.S. as a whole, Dr. Abd-alla mentioned that the basic EE curriculum could be greatly strengthened if the EE labs were coordinated with the networks and electronics courses.

Dr. Abd-alla is a member of the Association of Computing Machinery, (ACM). His outside interests include swimming and soccer, in which he was on the Ainshams University team as an undergraduate.

We of Mecheleciv welcome Dr. Abd-alla on behalf of the students and faculty of S.E.A.S.

*Editor's Note

MECHELECIV INTERVIEW:

SCOTT MANION

DIRECTOR OF ENGINEERING ADMISSIONS

Mr. Scott Manion is the driving force behind SEAS's revived admission office. When Mr. Manion came to SEAS, undergraduate enrollment was at its lowest point in the history of SEAS. This problem, however, was shared by engineering schools all over the country. We are pleased to see that since Mr. Manion's arrival, this trend has now been broken here at SEAS. Undergraduate enrollment is on the way up, as well as the academic qualifications of the new freshmen.

Mr. Manion has attended Indiana University, the University of Maryland, Landon School of Economics, and received his B.A. degree from the College of William and Mary in 1960. Mr. Manion was formerly with the Mine Engineering Laboratories at Yorktown, Virginia; the Aviation Research Laboratories at Fort Eustis, Virginia; and most recently, with the National Science Foundation.

Seeing the success Mr. Manion has had during his first year at SEAS, *Mecheleciv* thought it only proper to talk to Mr. Manion and discuss the techniques he is using to attract outstanding prospective engineers, and find out what prospects are for the future enrollment of SEAS.

MECHELECIV: What approach is being used to attract more students to SEAS?

MR. MANION: Let's look first at the undergraduate student. I think we should first consider the dissemination of all our promotional material, the contact with College Counsellors and further contact with prospective applicants to GWU. This involves the PR work. A great many of the Secondary School Counsellors are not aware of the GWU SEAS. Further, they honestly don't have any idea of what engineering is all about. It simply involves a chat with the counsellor to let them know how we operate here, the resources we have available, an idea of our concept of Engineering Education and an attempt to motivate them to "do business" with us. Once this hurdle is passed, there is contact with the students of the secondary schools. Again, this involves relating to the student the goals and ideals of SEAS; what we have to offer them here, facts about our faculty, our laboratories, and, in general, our entire concept of an Engineering Education. This is only the beginning so far as the Undergrad is concerned. There is follow-up from the time a student expresses an interest in SEAS up until he's either admitted to our School or decides to go elsewhere. This personal approach that we take toward all of the students is beginning to pay off in the long run. Let me illustrate: when a student thinks he wants to go into engineering, we invite him to come down and visit the campus and the School (without any hard salesmanship on our part). We give him an opportunity to meet and talk with some of the faculty, to meet and chat with students to have a tour of the labs, the campus and to just sit down and talk with us about engineering in general. I find that the students appreciate this and the faculty enjoys talking to young Engineering aspirants. Now suppose this person decides to apply to SEAS. From the moment this applicant comes in we like to maintain constant contact. This is done by including this individual on the distribution list of all our new materials and on the invitation lists of things that are going on at SEAS. In general, we try to keep him aware of SEAS throughout the Admissions cycle. Once he is admitted, he is immediately assigned a faculty advisor who is available prior to his decision to accept and prior to registration if he decides to come. Further, the entire staff of our Admissions Office is available to him if he should have any problems. If he anticipates having financial difficulty we attempt to channel the individual into one of our Co-operative Education programs with either NSRDL in Annapolis or the Coast Guard here in Washington. Suppose this student registers in SEAS. Our contact doesn't necessarily stop with his enrollment at that time. We've developed a good rapport between our office staff and students and we like to keep it that way. I think what I'm

attempting to say is that our recruiting of the student doesn't necessarily stop when he registers. In fact, we are interested in the student throughout his academic career.

Now let's consider the graduate applicant. Our promotional materials are distributed to a broad spectrum of individuals and organizations who might have personnel wishing to do graduate work. Many prospective applicants have been out of school a long time and want to resume graduate study. Others have recently left undergraduate study and wish to continue with graduate study. A good deal of our efforts go into processing of graduate applicants, particularly those who have been out of school for a long time. There is particular difficulty in the evaluation of foreign academic credentials. We are attempting to resolve this difficulty with the resources that are available to us. Give us a certain amount of time and I am certain we will have this problem whittled down to zero so that we can evaluate both foreign and domestic applications with only reasonable difficulty.

We have two off-campus graduate study programs; one at NASA-Langley in Hampton, Virginia and the other at NSRDL in Annapolis. The program at NASA can be termed a stabilized program. The one at NSRDL is still in the embryonic stage. In this respect, a great deal of time and effort goes into this NSRDL program. Within another year, this program should be stabilized. We are constantly attempting to develop new programs, both undergraduate and graduate. For instance, at the undergraduate level we have the two Co-op Programs. Now, we are constantly looking for new approaches to Co-operatives and getting industries in the area interested in the Co-op Program. This program is quite popular among undergraduates. It is also popular with the Employers. Schools across the country have been involved with Co-op education for decades, while the programs are reasonably new to SEAS. There is every possibility for making them full-blown programs here.

MECHELECIV: Would you give some idea on the past history of SEAS as viewed from an enrollment basis?

MR. MANION: When you ask for a few words on past enrollment history of SEAS, I would like to consider the last 3-year period. Where most schools have experienced rapid declines in their engineering curricula, SEAS has stabilized itself. This is by no means a point of optimism. Our goal, as I see it, is to revitalize the secondary school students in their consideration of engineering as a career and to channel this resource, the number of potential engineering students throughout the country, into SEAS. I think we can do it.

MECHELECIV: What are the prospects for next year as far as enrollment is concerned, and what is the main problem you have encountered in recruiting freshmen for SEAS?

MR. MANION: You ask what the prospects are for next year? Let's just take it a year at a time. I want to be the perennial optimist. The number of applications is nearly 100% higher than we had last year. We anticipate more applications. Since we have no definite cut-off date for receiving applications for SEAS at the undergraduate level we are still looking not only for stragglers but part-timers. With little exception, all the applications we have received for the Fall Semester are full time students. Then too, we can look forward to receiving applications from returning servicemen coming into the area as well as part-time students moved into the area because of job relocations. What we now have on hand is the basic core of applications, I think the present figure is going to go up considerably. It is safe to say we can comfortably take all applicants who meet our admission requirements. This is not to say that we are accepting anyone and everyone who applies. On the contrary, the faculty is looking for those students who are strongly motivated toward an engineering profession and who have the necessary mathematics and science preparation. Granted, there are many applicants who feel they are motivated toward engineering, but; upon close examination of their credentials, their background, perhaps even after a personal interview, we find that they could not possibly make it in SEAS; not only in SEAS, but in any School of Engineering. We aren't going to sweep streets in order to get numbers. All of us like to feel a student admitted to SEAS has a possibility of making it if he applies himself. In this respect, both faculty and staff work diligently to assist the student in academic difficulty.

When you ask about the main problem in recruiting freshmen for SEAS, the difficulty is hard to pinpoint. It is more or less a dual problem. So many secondary schools don't know about us. Further, so many secondary school college counsellors really don't have a finger on engineering as a profession. With regard to the latter problem, we are going out with a new type of educational program this Fall in making guidance counsellors more aware of engineering, what it entails, and what the basic qualifications are for engineering as a profession. This is going to help a great deal. We have contact specifically with most of the Schools this side of the Mississippi as well as some of the border states. We have had some special mailings during the past eight months with remarkable response. We are going to continue special mailings and continue distributing material through every possible avenue. This is going to take time. After a reasonably short time, I want to make sure that people are aware of SEAS. If they are not, it's because they can't read! I might mention in this respect that several schools I visited were totally unaware of us. This problem is being met head on. I might say that as a result of the growing rapport established between our office and secondary schools, guidance counsellors feel free to call us at any time with some of their problems.


CAVU*

OPEN

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ENGINEERS' WEEK OPEN HOUSE 1970

The School of Engineering and Applied Science celebrated National Engineers' Week by conducting its 9th Annual Open House. The Open House is a student sponsored and student run event, conducted each year during National Engineers' Week with the objective in mind of acquainting the general public with the Engineering Profession.

This year the Open House was organized and directed by J. Marshall Azrael, a senior E.E. major. Marshall's many months of planning were rewarded with an outstandingly successful Open House.

In all, forty government agencies, private companies, and professional societies provided many interesting exhibits and demonstrations. SEAS students also, as usual, held their own demonstrations in the various laboratories. This year more than 2000 people viewed the varied displays and demonstrations.

One of the more noteworthy student demonstrations was that of a quicksand tank in the Soils Lab. Here senior C.E.'s enlighted viewers to the causes of quicksand, and cleared up many fallacies existing about quicksand. The E.E. Lab was crammed full of working displays. These included the ever popular "sex-detector." This year's version incorporated many improvements over last year's model, and was even more effective in harrassing long haired boys and pretty young females. In the computer lab, students simulated a bouncing ball on an oscilloscope using an analog computer. Students marveled at the affects of changing the ball's elasticity, etc.

On February 27, in the new University Center Theater, the School of Engineering and Applied Science presented an engineering seminar to more than 100 students from the Baltimore Polytechnic Institute. The seminar was one of the many activities held by SEAS during National Engineers Week and SEAS Open House. The seminar tried to

HOUSE

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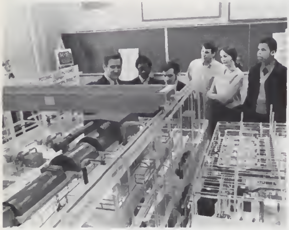
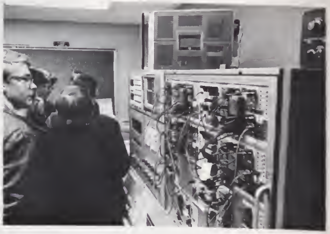
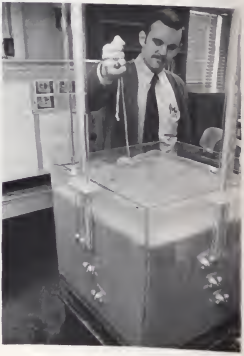





NAVAL SHIP R & D CENTER
SUPERSONIC
HYPERSONIC



SEAS SEMINAR

elucidate to the Poly students the aspects of Engineering currently researched at SEAS.

In his opening remarks, Dean Harold Liebowitz explained that this was the age of the Engineer. He continued to say that it was not a question of discovering and creating new technologies, but a question of applying the available technologies. The Dean closed by saying that the many problems facing man and his society, provided the Engineer with his opportunities.

In the remainder of the seminar, members of the SEAS Community elaborated on their work at SEAS. Dr. Joseph V. Foa, a recent addition to the SEAS Faculty, described the possible modes of transportation in the future. With the help of visual aids, Dr. Foa demonstrated the properties of propeller-less turbine cars which are capable of speeds up to 600 miles per hour. These compressed air driven cars not only help resolve the transportation problem, but completely avoid the problem of air pollution.

Dr. Walter K. Kahn, Professor of Electrical Engineering, described his work with the laser, a new tool available to Engineers which offers much promise in the fields of optics, communications, surgery, etc. The term laser is an acronym

from light amplification by stimulated emission of radiation.

Dr. Marvin Eisenberg, an initiator in the Medical Engineering Program at SEAS, commented on the challenge of Medical Engineering. Dr. Eisenberg discussed how the two professions had been molded into the one of Medical Engineering to achieve the objective of making and keeping man well through the application of Engineering and medical knowledge.

James B. Bladen, a senior in the Electrical Engineering Curriculum, expounded on his activities while working for the Rehabilitation Engineering Project. By the use of slides, Mr. Bladen showed the many devices he had developed for the use of the severely handicapped. Through this project, these handicapped people can now be employed as bookkeepers, key punch operators, and microfilm processors. The Baltimore Poly students were especially interested in this student aspect of Engineering problem solving.

After the seminar the students were given a chance to view some of the many other activities of the Open House at SEAS.

POLY SEES SEAS

Engineers In Administration And Management

By Jerrold M. Michael

Assistant Surgeon General

U.S. Public Health Service

INTRODUCTION

Management is an illusive rubric that often defies precise definition and yet history has proven it to be a particular forte of the engineer whose basic direction is toward precision and exactness. Management is most often defined as "getting planned things done through other people." Further investigation discloses that there are many synonyms for the word, such as, administration, supervision and leadership. They all have the same meaning varying only in the degree of responsibility for the activities of others, whether he be the chief engineer of the State Health Department or a head of a surveying team with only three or four people under his direction.

At times there is much confusion in the use of the terms "administration" and "management." In this presentation, the terms management, administration, supervision and leadership can be used interchangeably. They refer to the responsibility for the accomplishment of certain results from activities assigned to the individual.

Management as a science can be subdivided into a number of subsets. One of the most used describes management as being made up of the functions of Planning, Organizing, Directing, Coordinating, and Controlling. Having recognized this as the most commonly used system, it can be discarded for a more basic description – that management is in its essence composed of two elements, planning and operating. The former sets the pattern for conducting business, and the latter involves organizational direction. Of the two the one that uses the particular skills of the engineer is planning.

What, then are the managers' responsibilities as regards planning? They include the following:

1. Mission Definition: The need to clearly enunciate the mission of his organization.
2. Goal Setting: The need to define what goal his organization strives for and in so doing to describe its relationship to the goals of other generic organizations that may be addressing themselves in coordinated fashion to achieve a community of end points.
3. Assessing the Market: The need to quantifiably assess the "market" in terms of its demands, its defficiencies, and its strengths.
4. Developing Alternate Approaches: The need to evaluate in as objective a fashion as possible the alternate ways in which the organization, as an entity and as an aggregate of organizations in the operational arena, may best organize itself and themselves and their resources to meet the needs of the "market" and to show the most profitable returns as a result.
5. Stimulation of a Variety of Viewpoints: The need to integrate into the planning process a variety of viewpoints.
6. Setting Objectives: The need to set quantifiable objectives of milestones along the path to the organization's ultimate goal.
7. Setting Policy and Procedures: The need to set up policies and procedures for appropriately addressing the organization to the meeting of its objectives.
8. Laying Out the Plan: The need to delineate the total long-term and time-phased plan in such a way as to communicate it effectively to all members of the organization as well as those externally affected.
9. Defining Individual and Unit Operations: The need to define functions, responsibilities, and authorities, as well as standards of performance, for each

of the organization's units and individual members.

10. Developing an Information System: The need to develop an information system to guide operations, measure progress, dictate operational change, and advise those whose judgement and approval must be obtained on a continuing basis.
11. Weighting Human Satisfaction: The need to integrate into the planning process the elements of human satisfaction on the part of the customers or service recipients.
12. Developing People: The need to integrate into the planning process the growth and improvement of those rendering the service as well as those who benefit therefrom.

MISSION DEFINITION

Any organization that is to be effectively managed must have a clear conception of why it is in business. The mission would describe the general functions or services it performs and, in the case of governmental organizations, the limits of its jurisdiction and authority. In addressing itself to broader community-coordinated purposes, it is critical that the organization's mission be lucidly described so that its ultimate role in joint achievement may be defined. The mission becomes the baseline for the organization's operations. Ill-defined or loose generalities will often result in similar status in regard to efficiency in practice.

GOAL SETTING

A goal of the organization is a long-range anticipated achievement toward which programs are directed. Specific time for its achievement is not set. It may be as idealistic or ambitious as good judgement dictates, but it must be consistent with the organization's mission, although it is not necessarily limited by the current availability of resources or the current state of scientific art. Overlapping in the setting of organizational goals are as real managerial facts of life as are those of two companies competing for the consumer dollar in the field of entertainment.

ASSESSING THE MARKET

In the operation for profit business, the appropriate term is "forecasting" as the managerial tool of planning. The appliance manufacturer concerns himself with such things as changes in social forces, educational levels, and financial capacity of the consumer as well as raw population figures. In a similar fashion, the public works and health departments of expanding communities concern themselves with factors of health status, family demands, consumer volume needs, climatic conditions, and fire demands in assessing the problems of extending community water systems. In making these assessments, it becomes rapidly apparent that a great many organizational entities must be involved in the ultimate judgments as to the most appropriate individual organizational and community approach.

DEVELOPING ALTERNATE APPROACHES

In the engineering parlance, this management approach in the planning area may be paraphrased as the "system approach" to effective resource development. The sine qua non of this activity is the development of a series of approaches which address themselves to the market needs and from which may be produced the plan or combination of plans which have the greatest probability of producing the best final results concomitantly with the most prudent use of resources.

It involves the technical ability of the organization to dissect the market demands and needs into its lowest common denominator and from that point to display any number of alternatives, each of which or in a series of combinations may fulfill those demands and needs. These alternates will need to detail the resources required including such things as manpower, facilities, supplies, training, and research. This is necessary because the next logical step is the application of costing procedures that can result in an array of benefit or effectiveness against cost.

The good manager at this point must also recognize that "hard" facts alone will not permit for effective decision-making at this point. The less tangible factors including social forces must be considered in the judgment process which will result in a planned approach which will have a good prognosis for success.

STIMULATION OF A VARIETY OF VIEWPOINTS

No one organization, whether it be governmental or private enterprise, finds itself in the enviable position of being able to act unilaterally. For this reason, it is particularly important for the organization to be deeply committed to the thesis of community-wide coordination. In the health field, this is of paramount importance and gives rise to the need for a comprehensive planning instrument for each geographic or regional entity.

The thrust of the statement "variety of viewpoints" also implies an intramural responsibility within the organization to elicit as many viewpoints as possible in setting out alternate plans and in making choices to preclude the sterile unimaginative approach classical of an autocratic organization that discounts innovative approaches.

SETTING OBJECTIVES

On the basis of the analysis of alternatives, the manager is in a position to develop the organization's objectives and to detail the organization's plans on a short and long-range basis.

Objectives are established to clearly identify what is intended to be accomplished and so that progress toward this outcome can be measured periodically to provide feedback for program adjustment, and finally in order that the extent to which the objective has been achieved can be determined at a designated end point. The latter determination provides a baseline for future planning.

In a large organization, a hierarchy of objectives and levels of activities is necessary. All of the work done to meet objectives at one level of the organization permits the accomplishment of objectives at each successively higher level, and the overall objective of the organization will be accomplished only to the extent that the objectives of each organizational component are accomplished. No objective can be viewed completely as an isolated entity.

Quantification of objectives may take a number of forms ranging from effort units such as man-hours spent on survey and construction through output units such as miles of water pipe laid and number of outlet units protected against back siphonage and up to effect units such as final results on the individual's health, economic status, safety, or total well-being. In many cases, the objectives of the organization will vary through the whole range of these meansurements depending on the state of the art of measurement and ability (or cost) of data collection.

SETTING POLICY AND PROCEDURES

Policies and procedures are as much a part of the manager's planning process as the detailed plan of action. Rather than limiting individual freedom of action, it sets out the framework or constraints within which the individual has complete freedom to operate. In engineering parlance, these may be likened to the general requirements of a construction contract which are supplemented by the detailed specifications and design blueprints. The policies and procedures set the tone of organizational operation and reflect not only the mission and goal of the organization but also the relationships with other groups and organizations which are involved to one extent or another in the organization's operations or concerns.

LAYING OUT THE PLAN

In order to be communicated vertically and laterally within the organization and more importantly external to the organization, the plan must be committed to writing. As such, it becomes the manager's tool for assuring critical review and for acquiring concurrence and approval.

It becomes the blueprint for action not only for the components within the organization but external organizations as well. It also serves, as described below, as the take-off point for the development of detailed statements of functions, responsibilities, and authorities, and for the establishment of categorical plans.

The plan is a broad and yet dynamic document. As such, it describes the short and long-range actions but does not "lock" these into inflexible molds such that feedback of ineffective approaches cannot be used by the manager as a guide to adjustment of the specific or even the general program thrusts.

DEFINING INDIVIDUAL AND UNIT OPERATIONS

The development of a planned approach for the organization provides the manager with the opportunity to develop for each of his operating units, and for each individual therein, the written statements describing functions (major areas of concern), responsibilities (specific things that are to be done in relation to each function), and authorities (extent of final judgement related to each responsibility). This program by program and person by person detail makes meaningful to each echelon in the organization their part of the job and the interrelationships between jobs. It lends itself to functional analysis and, if done properly, assures the minimization of unnecessary and often conflicting overlap.

Moreover, the use of this type of management tool permits the development, from a generalized plan, of a categorical plan. It provides the opportunity to abstract from each separate program thrust those actions as an example that are to be taken by the construction engineer or by the design engineer. This kind of agglomeration not only makes meaningful the role of each discipline or unit, but it then permits them to organize to manage their time and effort more effectively.

Standards of performance, the development between each supervisor and his subordinate of agreed upon measures of satisfactory performance, is the ultimate refinement of the communication system to permit a full understanding of what is expected. Facetiously called the "ultimate in an employee mental health program," it permits the individual to give full professional expression to his work without the concerns of completing work which fails to meet the supervisor's expectations.

DEVELOPING AN INFORMATION SYSTEM

There is probably no more critical and also no more criticized area of the manager's responsibility than that of the development of an effective and yet low cost and non-cumbersome system for collection of data to facilitate

operations, measure progress (and even profit), dictate operational change, and provide the mechanism for the appropriate accounting to those individuals or groups (the public, legislature, or board of directors) who ultimately provide the resources for operations.

In the initial assessing of the "market", the organization manager will have to rely on what data are available at the time. In that assessment, however, he will become aware of the deficiencies and can plan for the development of a system to better provide the raw material from which more meaningful assessment can be made in the future.

In addition, his system design must be geared to measure progress toward what he has set out as objectives and to relate to the instruments or program areas he is or will be involved in. Thus, the system must be geared to the plan rather than, as often happens, to the reverse.

The system must also be one that does not fall of its own weight and must warrant the expense involved.

A critical consideration for the manager is "Who else needs these kinds of data?" as well as "Are they currently being collected in parts elsewhere and can it be done more effectively for many organizations by a central group?"

Obviously, the ease with which meaningful information can be obtained in an organized and in a timely fashion dictates consideration for an automated system, yet bearing in mind the battle cry of the ADP specialist – "garbage in, garbage out."

WEIGHTING HUMAN SATISFACTION

Since scientific management is a conscious, orderly and human approach to the fulfillment of management responsibilities, it is paramount that those three elements be kept in balance. If emphasis is placed upon the conscious and orderly aspects and not enough upon the human, the result could be a cold, efficient and expert type of robot manager whose efforts will meet strong human resistance.

The two basic tenants of this area of interest are that (1) it is not enough for the professionals to know what is "good" for the recipient, and (2) the value in the eye of the beholder (or recipient) may go far beyond the true or ultimate merit of the product service.

DEVELOPING PEOPLE

To return to the earlier definition of management – management is guiding human and physical resources into dynamic organization units which attain their objective to the satisfaction of those served and with a high degree of morale and sense of attainment on the part of those rendering the service.

There is one truth that has been learned by successful executives and supervisors which has had a decided effect upon their administrative attitudes and practices. Its acceptance or rejection divides managers into two distinct groups. The principle is this: MANAGEMENT IS NOT THE DIRECTION OF THINGS, IT IS THE DEVELOPMENT OF PEOPLE.

Management is taking people as they are, with what knowledge, training, experience and background they have accumulated, and developing these people by increasing their knowledge, improving their skill and by correcting their habits and attitudes. Upon this improvement depends the success of any managerial or supervisory effort.

As previously noted, the manager is constrained to establish objectives, to determine how far present performance varies from objectives and to discover means for closing the gap between actual practice and what is desired. In reality, that means that a basic function of a manager is to determine what people should, can and will do; to analyze the actions of people so as to know what they are doing; and to develop and promote plans which will prepare and inspire people to do better than they are now doing.

If this is true, it re-emphasizes the necessity for human understanding on the part of the manager. All administrative organizations are human organizations. The development of the highest objectives requires the development of the human beings that are in them.

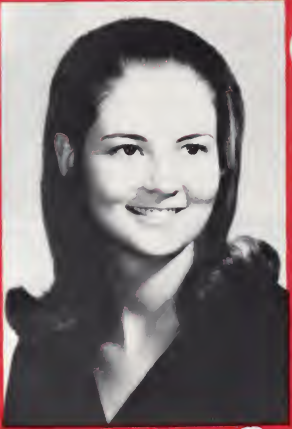
But what makes a good manager and thus a good planner? In the opinion of the writer, it is the sum of personal factors, training, experience, and willingness to face problems in a positive fashion, as did Churchill when he said, "A crisis is a dangerous opportunity."

Jerrold M. Michael, Assistant Administrator for the Program Development of the Consumer Protection and Environmental Health Service, is an Assistant Surgeon General in the Commissioned Corps of the U.S. Public Health Service, brings 19½ years of public health and medical management experience to his position. For a year and a half he served as Assistant Director of the Bureau of Health Services. Prior to that he was Associate Chief of the Bureau of Medical Services and also Chairman of a special Department Task Force on Planning-Programming-Budgeting.

Born in Richmond, Virginia, in 1927, Mr. Michael did his undergradnate work at the George Washington University where he received his Bachelor's Degree in Civil Engineering in 1949. While at G.W.U., Mr. Michael was on the staff of Mecheleciv *magazine as a copy editor. He received an M.S. in Engineering (Sanitary) from the Johns Hopkins University in 1950 and a Master of Public Health with a specialty in Epidemiology from the University of California in 1957.*

Mr. Michael, who has written widely in the fields of environmental health, management and health planning, is an Associate Editor of the Journal of Environmental Health. *He is an Associate Professor of Preventive Medicine and Public Health at the University of Oklahoma School of Medicine.*

ENGINEER'S BALL 1970



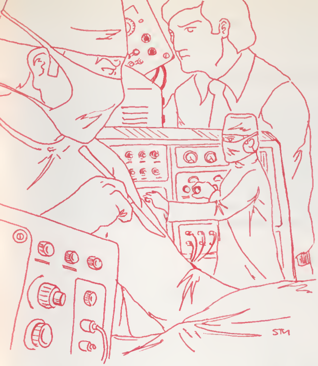
YOUR QUEEN

MISS HOLLY RITTER

The ballroom of the new University Center was filled with laughter and music. Greg Eichert (bartender extraordinaire) poured the liquor like water and faculty and alumni acted like students. The effect was unreal; the generation gap was truly spanned as student, faculty, administration, and alumni exceeded the optimum 'people density: square foot' rating of the newly initiated dance-floor, gyrating to the hypnotic, pounding beat of the nine piece rock band, The Invention.

It was a new decade and an all new Engineers' Ball. For as far back as memory services, we had the largest turnout of faculty and alumni plus the first completely free such event.

This once-a-year affair of the Engineering School is never a one man operation and the Chairman of this year's success, Mark Litchfield, would like to express his appreciation to all who helped. This notwithstanding, MECHELE-CIV Magazine would like to thank Mark on behalf of the students and faculty of S.E.A.S. for his superb organization which turned Engineers' Ball – 1970 from an event into a happening.



MEDICAL ENGINEERING

MEDLAB: A Computer System For Research and Clinical Application To MEDICINE

Edited by Jorge Aunon

In March of this year, The George Washington University Medical Center will receive a CDC 3300 computer (see *Figure 1*) with associated software and hardware that forms the core of a system called MEDLAB.

The MEDLAB system was developed at the Latter-Day Saints Hospital in Salt Lake City, Utah, under the direction of Homer R. Warner, M.D., Ph.D., Professor and Chairman of the Department of Biophysics and Bioengineering, University of Utah. MEDLAB is essentially a computer system for research and clinical application to medicine. Originally, research programs were developed for a cardiovascular research laboratory. It soon became apparent, however, that the programs could also be used in a clinical environment.

One of the first applications of the system was in the heart catheterization laboratory. As a catheter is advanced through one of the veins or arteries, pressure waveforms are generated. Depending on the location of the catheter with respect to the heart, the pressure waves differ considerably in shape and amplitude. Using these waves as input to the computer, interpolations, areas and landmarks are automatically calculated. Parameters such as stroke volume and peak systolic pressure are thus easily calculated by the computer.

In order to calculate the cardiac output, output volume of the heart in liters per minute, dye dilution studies are performed. An organic due is injected at an upstream site and a sampling site is located downstream. The bloodstream is monitored by an oximeter and the curve generated by the dye at the downstream site is found to be proportional to the cardiac output.

All of these studies which require long and tedious amounts of calculations are performed on-line with the MEDLAB system.

The CDC 300 Computer

Figure 1

NEW DEVELOPMENTS

As development continued, new clinical programs rapidly became available, such as intensive care monitoring and patient screening programs. New monitor software and hardware had to be designed. In order that the clinical users were not disturbed by new program developing and debugging, memory protect features were incorporated. A portable cart was developed through which the investigator could communicate with the computer. *Figure 2* shows a typical remote station. The station shown is the newest version of the single station type. The uppermost section is a Tektronix 5-inch storage display unit. The middle section is a digital unit manufactured by Beehive Electrotech, Salt

Typical Remote Station

Figure 2

Lake City, Utah. Octal thumbwheel switches and a numeric keyboard are provided for communication with the computer. The thumbwheel switches call the real time application program in the computer memory which may be remotely located. The numeric keyboard provides the operator with a means to input digital information. The lower section contains associated amplifiers to be used with the physiological signals monitored. Up to three signals from one patient may be monitored by the unit shown.

Larger units were also developed. These units will monitor up to six patients each, and their prime application is in intensive care monitoring. Each of the six patients may be monitored as often as every two minutes. Each of these units contains a matrix of 6 x 4 warning lights, i.e., four per patient. The warning lights may be turned on when selected parameters deviate from base values as established for each patient.

PHYSIOLOGICAL MONITORING

The basis of the physiological monitoring is an arterial pressure waveform obtained via a catheter, usually introduced at an arm site and advanced to the subclavian artery. The pressure transducer detects the pressure wave generated through each cardiac cycle and parameters are measured and correlated with physiological conditions. The pressure wave (*Figure 3*) has certain important landmarks that are noted. The maximum amplitude in the curve or line A-A', is

The Pressure Wave

Figure 3

the peak systolic pressure; the minimum in the curve, or line B-B', is the diastolic pressure. For normal people, peak systolic over diastolic or blood pressure is approximately 120/72 mm.Hg. The little notch C is called the dicrotic notch and is caused by the closure of the semilunar valves. The semilunar valves connect the left ventricle with the aorta and the right ventricle with the pulmonary artery. After dye dilution calibration studies, parameters such as stroke volume in cubic centimeters, rate in beats per minute, cardiac output in liters per minute, etc., may be calculated on a real-time basis.

GEORGE WASHINGTON UNIVERSITY'S SYSTEM

The system to be installed at The George Washington University Hospital will consist of the following:

a) A CDC 3300 computer system, with 32K memory, 24-bit word, 6 input/output channels, A/D-D/A and floating point arithmetic.
b) A card reader
c) A high speed line printer
d) Three disk drives
e) Two magnetic tape units
f) A 40-channel multiplexer
g) Ten remote terminals similar to the one shown in *Figure 2*. Some of these will be strictly digital terminals for teaching, communication and debugging purposes and will not incorporate analog hardware.

h) Two intensive care unit terminals capable of monitoring up to six patients each.

Because of lack of space in the hospital, the computer will be remotely located in the Warwick Building, formerly the Cancer Clinic, 2300 K Street, N.W. Data transmission will be via digital and analog telephone data sets through dedicated lines leased from the Bell Telephone System. The system will first be operational in the Special Care Unit, and then portable terminals will be made available on an on-call basis from the operating rooms and recovery rooms.

SOFTWARE

From the software point of view, the MEDLAB system could be considered as the composite of the following four types of computer programs:

(1) MEDLAB Monitor Program
An executive routine or an operating system which regulates and directs all on-line real-time activities in a multi-programmed time-shared environment.

(2) Systems Utility Programs
This is a group of programs performing a general function like systems programs library maintenance, control of the Input/Output peripheral routines, etc.

(3) Real-time Application Programs
This set of real-time programs forms the core of the patient monitoring and record-keeping capabilities of the MEDLAB system.

(4) Non-real-time Processing
Since we are dealing with real-time applications, the use of the printer is unacceptable for on-line operations. A linkage must exist between real-time data and printer output. This is what comprises non-real-time processing. Program development and debugging are also done on a non-real-time or background processing basis.

This software system, although subject to constant modifications, was first developed some six years ago. This accounts for the fact that the two languages used are somewhat primitive. BAP (Basic Assembly Programming) and FORTRAN II are used with the system. BAP is the real-time machine language utilized by the lower 3000 CDC computer systems. COMPASS is a more recent machine language having more flexibility than BAP. BAP is a subject of COMPASS.

In the not too distant future, the operating systems and most of the programs will be changed to COMPASS and FORTRAN IV. This will, in turn, require more computer memory for residency of the operating system.

A unique feature available with MEDLAB is the possibility to selectively step through a program for debugging purposes from any remote terminal.

As time permits, students from the University will be permitted to become familiar with the equipment and procedures and will be allowed to conduct experiments or projects suitable for theses or dissertations.

Funds for The George Washington University MEDLAB facility have been provided by a Public Health Service contract (HSM 110-69-236) as a demonstration in transferability of a sophisticated patient information capability and to permit evaluation and development of the facility in a new environment. It is anticipated that the MEDLAB facility will play a significant role in community-wide delivery of health care services.

Mr. Jorge Aunon has a B.S. in Engineering Science from the G.W.U. S.E.A.S., 1967, and an M.S. in Medical Engineering from the G.W.U. S.E.A.S., 1969. Mr. Aunon is a Doctoral candidate with a major in Medical Engineering. He is a medical engineer under the Automated Patient Monitoring Program and an Instructor in the Department of Clinical Engineering. His address is 2300 K St., N.W., Washington, D.C. and may be reached at 331-6836.

SHAFTED AGAIN

There once was a curator of the National Zoo, who in his desire to enlarge his supply of gorillas, sent his right-hand man George on safari to darkest Africa. When George arrived on the scene, he wandered through the native village and soon came upon a sign which read "Aku's Gorilla Hunting Team." George walked in and there sat a tall, burly native who introduced himself as Aku. He agreed to take George on a gorilla hunt the next afternoon.

When George arrived at Aku's hut the next day, he was amazed at what he saw; besides Aku, there were three other members of the team: one man carrying a large net and several strong ropes, another man holding a huge rifle, and last but not least, a huge, wild-eyed dog with long fangs protruding from his immense jaws. They then set out on their mission of capturing gorillas, and soon after, they began their trek through the jungle. Aku soon spotted one in a tall tree, and quickly climbed up after it. Aku chased the gorilla out on a branch, began wrestling with it, and then pitched it out of the tree. As it landed, the tremendous dog leaped upon it and clamped its jaws on the poor gorilla's most vulnerable area. Meanwhile, the man with the net and ropes came out and tied up the beast, but during the whole process the man with the gun just stood there, and George took note of this.

When they returned to their camp, George took Aku aside and explained to him that he would make more money for himself if he got rid of the man with the gun, since the man just stood around doing nothing, but to this Aku emphatically replied, "He stay, he stay!"

Well George overlooked the stubbornness of the native, and the next day they went hunting for more gorillas. Aku looked up into a tall tree, and there he saw the biggest, fiercest-looking gorilla he had ever seen. He hesitated for a second, and then began climbing up after it. He ran out on the branch, and there he wrestled for several minutes. Finally the gorilla picked Aku right off his feet and threw him out of the tree. As he fell toward the ground he yelled to the man with the gun, "Shoot the dog, shoot the dog!!"

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Our Word-book defines Thermometers as something else graduated with degrees without having brains.

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Two hunters in Africa were caught by cannibals and put into a huge cooking pot, one man laughing hysterically. Annoyed, the other asked, "What's so funny?" The first replied, "If only they knew what I was doing in their soup!"

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Psalm of the Twenty-Third Year

Dr. (fill in here) is my instructor;
I shall not pass.
He maketh me to exhibit mine
ignorance before the whole class.
He telleth me more than I can
write,
He lowereth my grade.
Yea, though I walk through the
corridors of knowledge, I do not
learn.
He tries to teach me;
He writeth the equations before
me in hopes that I will under-
stand them.
He bombardeth my head with
integrations.
My slide-rule freezeth up,
Surely enthalpies and entropies
shall follow me all the days
of my life,
And I shall dwell in the School of
Engineering forever.